

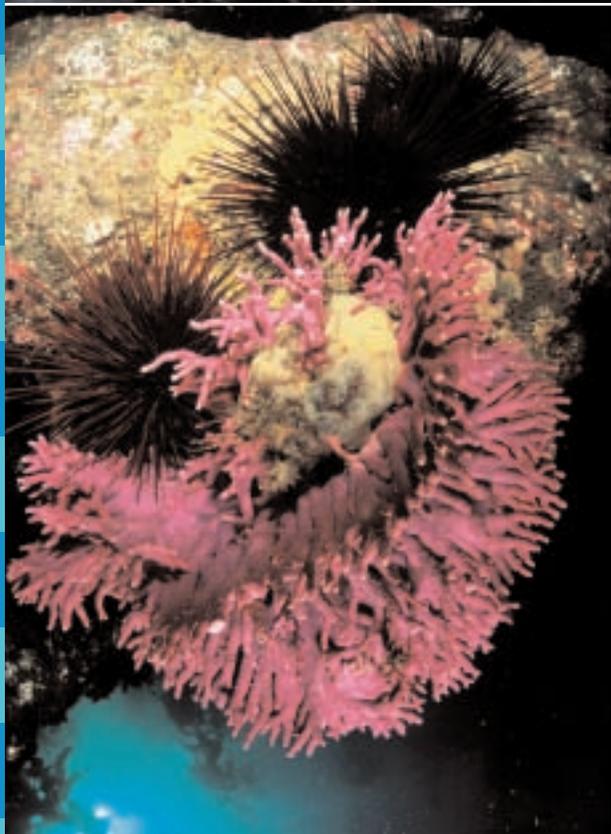


ALOOLKOY

News from the Channel Islands National Marine Sanctuary



NATIONAL MARINE
SANCTUARIES™
CHANNEL ISLANDS



MARINE RESERVES MONITORING

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Volume 18
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From the Bridge

The Importance of Marine Reserves Monitoring

By **Chris Mobley**

In 2003, the State of California established a network of marine reserves (no-take zones) and marine conservation areas (limited take zones) in state waters of the Channel Islands National Marine Sanctuary. This year, the sanctuary will release a draft environmental impact statement that proposes to extend this network into federal waters, nearly doubling protected areas from approximately 10 percent to approximately 19 percent of sanctuary waters.

Even though only the state waters portion of the network has been completed, this is the largest network of marine protected areas on the west coast of North America. Its design involved extensive community and scientific input, initiated by citizens concerned about the long-term decline in the health and abundance of sanctuary resources.

The sanctuary is dedicating this issue of the *Alolkoy* to marine reserves because stakeholders and the general public are all keenly interested in the subject. We hope that people will learn more about the research that is under way, who is doing the work, what we expect to learn, and when we expect to obtain statistically reliable research data.

Potential Benefits

Based on international scientific data on marine reserves performance, as well as results seen over decades of no-take protection at Anacapa Landing, resource managers and marine scientists predict that the marine reserves network will help protect and enhance sanctuary resources over the long term. For example, biodiversity, abundance, and size of marine fishes and other species may increase significantly within marine reserves. In addition, socioeconomic analyses predict that the short-term impacts of implementing the network should be relatively small, and that the long-term benefits could be significantly large.

Are the Reserves Working?

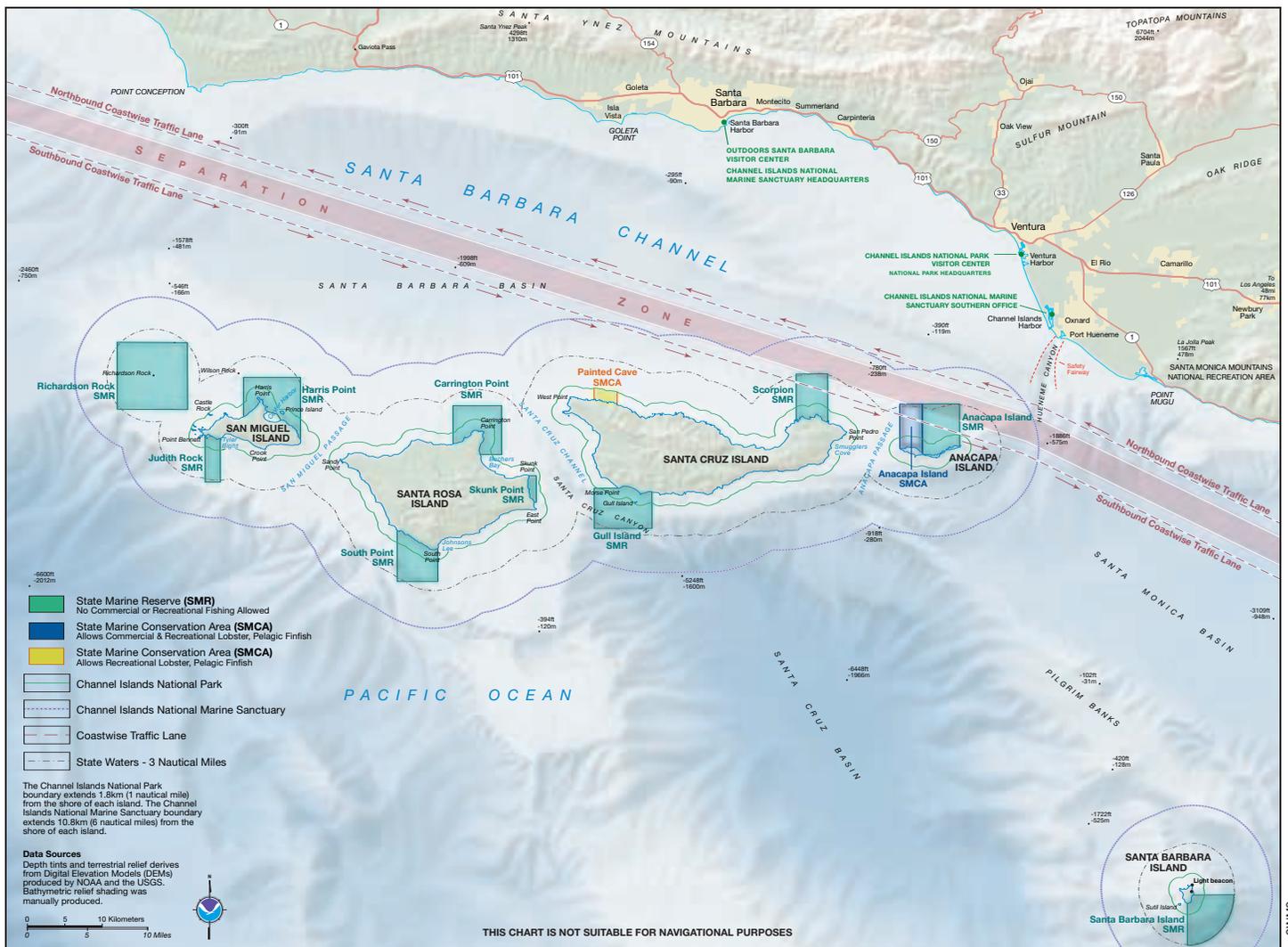
Naturally, stakeholders in the sanctuary are asking variations on one big question:

“Are the reserves working?” For example:

- Decision-makers want to know whether this approach is an effective tool for ecosystem-based management. They know that our oceans are in trouble and that we must find ways to improve long-term conservation. More immediately, under California’s Marine Life Protection Act, the Fish and Game Commission must make decisions on additional marine reserve network proposals up and down the state.
- Commercial and recreational fishermen want to know more about the socioeconomic impacts of establishing reserves—i.e., closing off areas of the sanctuary to fishing—and whether there is any payoff in the spillover of species from protected areas into the surrounding unprotected areas.
- Scientists want to understand how ecosystems respond to this new management regime. For example, if lobster and sheephead increase in protected areas due to reduced fishing pressure, does that result in a decrease in urchin, since lobster and sheephead eat urchin? Does the decrease in urchin result in an increase in kelp, since urchin eat kelp? How do changes like these affect an ecosystem’s resilience to El Niño events or pollution, its ability produce harvestable resources, or its resistance to invasion by introduced species?
- Resource managers want to know how best to protect marine reserves. What is the best way to educate the public on the reserves’ location and regulations? Are individuals willing to comply with the regulations once they understand them? What resources—wardens, boats, aircraft—are needed to address poaching and other violations? Will users exert peer pressure on each other to comply with the regulations?

The Need for Monitoring

This short list gives a sense of how many concerns are embedded in the question, “Are



This map shows the existing marine reserves network in the state waters of the sanctuary, which includes both state marine reserves (no-take zones) and state marine conservation areas (limited take zones). For a map of the proposed federal extensions, see page 14.

the reserves working?” The only way to find out is to conduct ecological and socioeconomic monitoring. We are already obtaining excellent data on short-term socioeconomic impacts and on regulations and compliance questions. Ecological questions might take years to answer. We may get initial indications of species response in the first five years, but most scientists believe it will take 15 years or longer to see significant, broad-scale changes in abundance, diversity, and productivity.

Fortunately, the Channel Islands may be an ideal location for answering many of these questions. First, the islands are offshore, reducing the influence of human factors like pollution that could confound the research if conducted along the mainland. Second, local waters include an incredible diversity of habitats and species, so the results will be of interest to resource managers ranging from Mexico to Alaska.

Third, a number of key agencies have overlapping jurisdiction in the Channel Islands and are committed to supporting monitoring and enforcement—including the sanctuary, Channel Islands National Park, the California

Department of Fish and Game, the National Marine Fisheries Service, and the U.S. Coast Guard. Fourth, top-notch research institutions such as the U.S. Geological Survey and UC Santa Barbara have already conducted monitoring in the Channel Islands for many years, and they are working with each other and the agencies to implement marine reserves monitoring programs.

Public Involvement is Key

Citizens throughout California, but especially from Los Angeles County to Santa Barbara County, really care about the long-term health of the sanctuary. Many invest their energy and time through stakeholder groups such as the Sanctuary Advisory Council and the Channel Islands Naturalist Corps. Active public involvement and interest is why the first west coast marine reserves network was established here, and public involvement will ensure that agencies and research institutions continue to effectively manage and monitor the marine reserves network.

Chris Mobley is Superintendent of the sanctuary.

Socioeconomic Research: Recreational Boater Surveys

By Chris LaFranchi

An important aspect of socioeconomic research is understanding the long-term effects of marine reserves on people and sanctuary ecosystems. Do reserves help maintain productive, sustainable ecosystems that provide what humans want and need?

After no-take marine reserves were approved in 2003, the sanctuary and the California Department of Fish and Game laid the groundwork for monitoring socioeconomic conditions. With the help of partners, the sanctuary is developing a social science program that will ultimately construct a more complete picture of human-sanctuary interactions.

These interactions are categorized as consumptive (e.g., fishing, spear fishing), non-consumptive (e.g., kayaking, surfing, and wildlife viewing), passive (e.g., learning about the sanctuary through reading), and education and research-related (e.g., lectures and exhibits). While much information exists in the consumptive and education/research categories, there has been little formal study of non-consumptive and passive sanctuary use.

One of the first steps in the sanctuary's socioeconomic research effort is to obtain more information on recreational



© C. LaFranchi

Researchers prepare to administer the recreational boating survey to Channel Islands boaters. Clockwise from top: Allison Chan (NaturalEquity), Miwa Tamanaha (NaturalEquity), Erin Gaines (NOAA Hollings Intern, Stanford University undergraduate), and Ryan Vaughn (UCLA doctoral candidate).



© NaturalEquity

Researchers pose with the first Channel Islands boater to complete the tour and survey aboard the R/V *Shearwater*. Left to right: Christy Loper (NOAA Knauss Fellow), Julie Bursek (Sanctuary Education Coordinator), Miwa Tamanaha (NaturalEquity), Linwood Pendleton (UCLA Associate Professor), boater, Ryan Vaughn (UCLA doctoral candidate), and Chris LaFranchi (Sanctuary Social Science Coordinator).

boating and its associated activities, like diving, kayaking, surfing, and wildlife viewing. The sanctuary and its partners are implementing recreational boater surveys to fill the gap.

2006 Surveys

Between May and December 2006, three separate surveys are taking place: a recreational boater survey, a postcard survey, and an anchorage choice survey.

In the recreational boater survey, the NOAA vessel R/V *Shearwater* approaches boaters out on the water, inviting them to come aboard to take the survey and enjoy a vessel tour.

The postcard survey, which takes about two minutes to complete, is given to boaters at fuel docks, chandleries, launch ramps, and yacht clubs. It is also inserted with marina bills (slip fees) as a mail-back survey.

The anchorage choice survey is administered by phone or online. The first 300 boaters who complete the anchorage survey will receive a coupon from West Marine.

These surveys were designed by experts at the University of Colorado, the University of Delaware, and Ohio State University. In addition, researchers from NaturalEquity (www.naturalequity.com), an independent and non-commercial organization, conducted focus groups with boaters before implementing the surveys. All stages of the surveys involve a formal peer review process.

Boater Survey Protocol

To gather data for the recreational boater survey, researchers and sanctuary staff hail boaters from a skiff launched from the R/V *Shearwater*, the sanctuary's 62-foot aluminum catamaran. They then invite boaters to come aboard the vessel to take the survey and enjoy a tour. R/V *Shearwater* staff and a Channel Islands Naturalist Corps volunteer answer questions about the sanctuary and its programs.

The survey is conducted using a custom-designed ArcView geographic information system (GIS) program. This interactive program runs on a laptop computer and allows boaters to zoom in and out on digitized nautical charts—drawing and automatically logging areas where they spend time in the sanctuary. The program makes it easy for boaters to show exactly where they go for fishing, diving, kayaking, wildlife viewing, and other activities.

Participants are also asked to fill out a paper survey about how they perceive the sanctuary and its goals, especially in relation to marine reserves. The data are entered into a computer later. While information from individual boaters is kept confidential, a summary of the data will be available online in 2007. (www.oceanstudy.net/info.htm)

On average, it takes less than 30 minutes to complete the two-part survey. The researchers' goal is to gather 300 responses. The majority of boaters contacted so far have enthusiastically agreed to come aboard the R/V *Shearwater*. Despite challenging weather during the first official cruise on Memorial Day, 10 boaters completed the surveys and took the tour. On July 4th weekend, an additional 30 boaters participated.

The recreational boater survey offers opportunities for education and outreach to an avid group of sanctuary users. Boaters who complete the survey receive a DVD on the sanctuary as well as literature on the sanctuary, park, and marine reserves. During the Memorial Day cruise, the survey stimulated discussion about many important issues, including boundaries and restrictions in the sanctuary, no-take marine reserves, and the long-term impacts of reserves.

The Memorial Day effort benefited from the presence of Dennis Carlson, a Channel Islands Naturalist Corps volunteer who is a longtime and experienced boater. Dennis is adept at providing R/V *Shearwater* tours and talking about boating generally in the Channel Islands.

Survey Partners and Data

The surveys are part of larger study of recreational boating being conducted by researchers from NaturalEquity and University of California Los Angeles. The Resources Legacy

Sanctuary Social Science Coordinator Chris LaFranchi helps a Channel Islands boater transfer to the R/V *Shearwater's* skiff.

© Miwa Tamanaha

Fund Foundation and West Marine also support the study. This multi-year effort, launched in May 2005, will help the sanctuary and its partners understand recreational and resource use patterns, attitudes and perceptions of recreational boaters, and their economic contribution and impact.

Survey data will be combined to create the first inventory of recreational boaters in the sanctuary. It will include characteristics of boats and boaters, use patterns and related activities, and how much boaters know about the sanctuary and where they acquire their information about it.

In addition, expenditure data will provide insights about how much money boaters spend in the local economy and how those expenditures relate to specific areas and features of the sanctuary. The data will be used to estimate a model of boater behavior, increasing understanding of boaters' anchorage and activity choices.

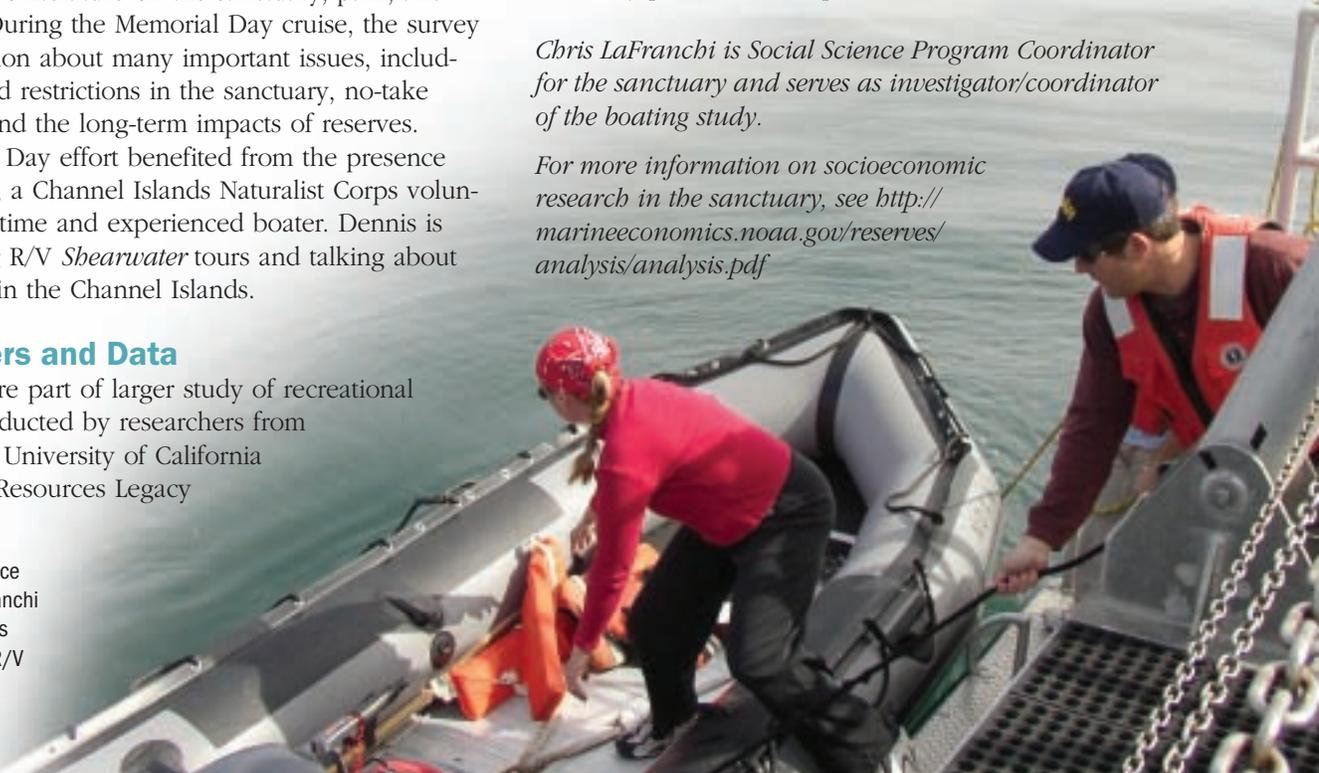
An Ecosystem Approach

Sanctuary managers and policymakers increasingly think in terms of entire ecosystems. Humans derive benefits by interacting with sanctuary ecosystems and, in the process, influence ecosystem function, productivity, and resilience. Understanding how humans interact with and benefit from the sanctuary is essential for effective ecosystem management and stewardship.

Through the recreational boating surveys, researchers are exploring the significance of private boating, both to the local economy and to the ecosystems that the sanctuary is tasked with protecting and managing. The resulting data will enhance opportunities for managers and policymakers to include humans in an ecosystem-based approach. The data will also help demonstrate how the sanctuary's ecological attributes, some of which are directly affected by marine reserves, influence where boaters go, what they do, and how they perceive the experience.

Chris LaFranchi is Social Science Program Coordinator for the sanctuary and serves as investigator/coordinator of the boating study.

For more information on socioeconomic research in the sanctuary, see <http://marineeconomics.noaa.gov/reserves/analysis/analysis.pdf>



Biological Monitoring in the Sanctuary

By Dani Lipski

Recommendations for biological monitoring in the sanctuary's state marine protected areas were developed in a workshop attended by the scientific community, recreational and commercial fisheries, conservation groups, government agencies, and the general public. In 2004, the California Department of Fish and Game incorporated these recommendations into a monitoring plan.

The plan builds on historical data from the Channel Islands region and present-day monitoring programs. Its goals are to determine the effects of marine protected areas on species, ecosystems, and habitats; and to improve or sustain local fisheries. Although some species and habitats respond quickly to protection, others may not respond for years or decades. Long-term monitoring will play a vital part in helping the sanctuary understand, manage, and sustain the Channel Islands' marine ecosystem.

Areas of Study

Biological monitoring programs seek to determine the impacts of marine protected areas on:

- Species **abundance, individual size, biomass, and spawning biomass**
- **Species composition** as it relates to ecosystem functions
- **Habitat** as related to physical alteration (e.g., fishing) and secondary impacts of biological community changes (e.g., habitat-forming algae)

- Species **spillover** from marine protected areas into adjacent areas
- **Catch per unit effort (CPUE)** and total catch

The scientific literature about fully protected marine reserves describes positive changes in marine populations, communities, habitat, and catch. Formerly fished species may exhibit increases in **abundance, individual size, biomass, and spawning biomass**. The extent of change depends on fishing intensity over time, the location of potential source populations, and species growth and reproduction rates.

Even non-fished species may exhibit changes in population size if they are connected to a fished species through predator or prey interactions. These indirect effects can result in altered **species composition** of a marine community. One example is an increase in lobsters as a result of protection from fishing that leads to a decrease in urchins and an increase in kelp and kelp-associated species.

Habitat changes may result from the prohibition on physically altering the seabed with bottom fishing gear. Undisturbed seabeds are more suited to support growth of habitat-forming species. Also, changes in species composition may result in changes to habitat (e.g., an increase in grazers may decrease habitat-forming algae).

Spillover occurs when more individuals of a particular species leave a

marine protected area than enter it. Spillover may affect species populations outside marine protected areas; more individuals available to a fishery could result in a higher catch per unit effort (**CPUE**).

All of these potential changes must be monitored to determine the impacts of marine protected areas on species, ecosystems, habitats, and fisheries. The following monitoring programs, most with support from sanctuary staff and/or vessels, are tracking the effectiveness of marine protected areas, with the preliminary evaluation expected in 2008.

Fish Transect Surveys

The Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) at UC Santa Barbara's Marine Science Institute began research in the sanctuary in 1999. Scientists conduct fish transect surveys, monitor young invertebrates and fish, record oceanographic conditions, and track fish movements using microchemistry and acoustic receivers. This program helps answer questions about species abundance, size, composition, and habitat changes. www.piscoweb.org/research

Kelp Forest Monitoring

Channel Islands National Park biologist David Kushner leads a team of scientists who have monitored kelp forest sites near the islands for the past 24 years. Partners include the sanctuary, California Department of Fish and



Cowcod (*Sebastes levis*) are among the fish species tracked by biological monitoring programs.



A PISCO scientist retrieves a larval collector as part of the program's ongoing surveys inside and outside of marine reserves.



Researchers from Love Lab conduct studies of invertebrates like this basket star (*Gorgonocephalus eucnemis*).

Game, National Marine Fisheries Service, PISCO, and others. Currently scientists collect baseline data from 33 sites inside and adjacent to four marine protected areas. They study the population dynamics of over 68 taxa (categories) of algae, fish, and invertebrates and log temperatures at each site. This program contributes to knowledge of species abundance, size, and communities. www.nature.nps.gov/im/units/chis/marinereports.htm

Rocky Intertidal Monitoring

Channel Islands National Park researcher Dan Richards leads the Rocky Intertidal Monitoring Program which studies approximately 32 invertebrate and algal taxa. Measurements take place at fixed plots, photographed and scored each spring and fall.

This program began in 1982 at Anacapa Island and now includes 21 sites in park and sanctuary waters. The data help determine intertidal population, community, and habitat changes as well as providing a baseline for evaluating future population shifts. www.nature.nps.gov/im/units/chis/marinereports.htm

Deepwater Submersible Surveys

Milton Love, head of Love Lab at UC Santa Barbara, has conducted deepwater submersible surveys for many years in the Channel Islands region. Lab researchers take baseline surveys of fish, invertebrates, and habitats in current and proposed marine protected areas. Love also continues to investigate black corals, sponges, and other

habitat-forming invertebrates, providing valuable information on these and other species and communities. www.lovelab.id.ucsb.edu

ROV Monitoring

The California Department of Fish and Game, in partnership with the sanctuary, The Nature Conservancy, and Marine Applied Research and Exploration, uses a remotely operated vehicle (ROV) to survey fish populations. This research monitors changes in finfish density on hard bottom reefs beyond the depth limits of SCUBA divers. 2005 marked the third year of this research, which samples sites inside and outside marine protected areas and provides information about fish populations and communities. www.dfg.ca.gov/mrd

SCUBA Fish Surveys

Reef Environmental Education Foundation (REEF) volunteers conduct fish surveys using SCUBA in the sanctuary. The annual survey plan includes 30 sites inside and outside marine protected areas: seven sites near San Miguel Island, eight near Santa Rosa Island, eight near Santa Cruz Island, and seven near Santa Barbara Island. As of April 2006, 1,444 REEF surveys had been conducted documenting 122 species of fish in the sanctuary. This program helps evaluate changes in fish populations and communities. www.reef.org

Juvenile Fish Recruitment

Donna Schroeder of UC Santa Barbara's Love Lab conducts SCUBA surveys for fish and invertebrates in and

around marine protected areas. Since 1995, Schroeder has gathered data on juvenile fish recruitment around Santa Cruz and Anacapa islands that can be used to estimate recruitment before and after the establishment of marine protected areas. Schroeder has also surveyed fish, invertebrates, and kelp density at sites near Santa Rosa Island that provide information on species abundance, community structure, and habitat. www.lovelab.id.ucsb.edu

Invertebrate and Eelgrass Monitoring

Jack Engle of UC Santa Barbara's Marine Science Institute has surveyed invertebrates annually since 1982 and has monitored eelgrass for many years at Anacapa Island. Engle also conducts roving diver surveys for fish. The focus of his research is to learn how species interact to maintain stable habitats. His work contributes to understanding changes in populations, communities, and habitats in marine protected areas. www.tatman.org

Acoustic Monitoring

Researchers Michael Domeier and James Lindholm of the Pflieger Institute of Environmental Research (PIER) use acoustic receivers to track the movement of fish around the Channel Islands. Individual fish are tagged and monitored by an array of 96 acoustic receivers. This research will help determine species spillover from marine protected areas. (See page 9 for more details.) www.pier.org

Dani Lipski is a Research Assistant at the sanctuary.



Researchers from the California Department of Fish and Game deploy a remotely operated vehicle (ROV) from the R/V *Shearwater*.



SCUBA surveys provide valuable data on changes in fish populations.



The Delta submersible allows scientists to make detailed observations of deepwater invertebrate communities.

California's Marine Life Protection Act

By John Ugoretz

In the late 1990s, the State of California responded to declines in marine resources with legislation to protect the ocean. Among other laws, the 1999 Marine Life Protection Act (MLPA, California Fish and Game Code, sections 2850 to 2863) aims to create a network of marine protected areas. The act requires a comprehensive master plan, a Marine Life Protection Program, and the MLPA Initiative—a public process to implement the act on a regional basis.

The act describes “marine life reserves” (no-take areas) as essential elements of marine protected areas. It recognizes that no-take reserves “protect habitat and ecosystems, conserve biological diversity, provide a sanctuary for fish and other sea life, enhance recreational and educational opportunities, provide a reference point against which scientists can measure changes elsewhere in the marine environment, and may help rebuild depleted fisheries” [subsection 2851(f), FGC].

Program Goals

The master plan must include recommendations for marine protected areas with “an improved marine life reserve component” [subsection 2853(c)(1), FGC]. The act establishes six goals for the Marine Life Protection Program:

- To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems
- To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted
- To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity



Species that stand to benefit from the establishment of new marine protected areas on California's Central Coast include lingcod (left, *Ophiodon elongatus*) and wolf eel (right, *Anarrhichthys ocellatus*).

- To protect marine natural heritage, including representative and unique marine life habitats in California waters, for its intrinsic value
- To ensure that marine protected areas have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines
- To ensure that marine protected areas are designed and managed, to the extent possible, as a network

The Central Coast Study

Between October 2004–March 2006, the California Department of Fish and Game (DFG), along with outside partners, implemented the MLPA Initiative, examining a preliminary study region along the Central Coast between Pigeon Point (San Mateo County) and Point Conception (Santa Barbara County). The partners convened a working group of more than 50 people, compiled information on habitats and uses, and held public meetings. California Secretary for Resources Mike Chrisman appointed a blue ribbon task force to provide oversight.

After the working group developed a range of proposals for marine protected areas, the task force forwarded a preferred package to DFG for consideration. DFG delivered its preferred alternative to the California Fish and Game Commission on June 22. This alternative includes 26 marine protected areas covering about 208

square miles, representing approximately 18 percent of state waters in the Central Coast region. Of these, 13 are no-take state marine reserves covering about 93 square miles, or approximately 8 percent of state waters.

The commission heard testimony on the preferred alternative in August and selected a final plan for the Central Coast's marine protected areas.

NOAA Partnerships

NOAA and the National Marine Sanctuary Program offered valuable assistance to the MLPA Initiative. Staff from Monterey Bay National Marine Sanctuary participated in the stakeholder working group and assisted with GIS mapping, data collection, and data compilation. NOAA's Marine Protected Area Center and the Sanctuary Program also provided financial support for a mapping tool and fishing data collection.

Partnerships between NOAA and DFG are important to implementing state marine protected areas. As demonstrated during the creation of such areas in Channel Islands National Marine Sanctuary, the Sanctuary Program provides support for public processes and planning as well as staff, equipment, and financial support. These partnerships will help California meet the MLPA mandate more quickly and implement a comprehensive network of marine protected areas.

John Ugoretz is Nearshore Ecosystem/MLPA Coordinator for the California Department of Fish and Game.

Acoustic Fish Tracking at Anacapa Island

By Jonna Engel

Knowledge about the movement of fishes in relation to marine reserves boundaries is vital to successful conservation and management. Traditional field approaches such as snorkel and SCUBA diving, occupied submersibles, and remotely operated vehicles provide data on the behavior of fish and their environment. However, these approaches have limited ability to follow individual fish for extended periods of time. Acoustic tracking techniques supply the means to collect such data.

The Pflger Institute of Environmental Research (PIER) is using an acoustic receiver array around the Channel Islands to track the movements of several fish species. A subset of this project, directed by PIER senior biologist James Lindholm, is looking at the movements of California sheephead (*Semicossyphus pulcher*) and kelp bass (*Paralabrax clatbratus*) in relation to the boundaries of the state marine reserve at Anacapa Island.

Tags and Receivers

In order to track fish movements, an acoustic transmitter (or tag) is surgically implanted in individual fish. The transmitter emits a unique pulse every 60-180 seconds that is recorded by acoustic receivers whenever a tagged fish swims into range. The transmitters



A PIER researcher releases a tagged California sheephead (*Semicossyphus pulcher*).

in smaller fish last up to two years, while those in larger fish last up to five years. The larger transmitters also provide information on fish depth movements.

Currently there are 96 acoustic receivers, or listening stations, deployed throughout the Channel Islands and at key locations on the mainland. Each receiver constantly "listens" for tagged fish to swim into range, approximately 500 meters in any direction. At Anacapa Island, a total of 44 receivers surround the island in two concentric rings, providing receiver coverage from the nearshore to 2 km offshore. This includes 11 receivers within the state marine reserve.

Data are downloaded from each of the receivers every four to five months. Receivers at depths of less than 30 meters are accessed by SCUBA divers, while receivers at greater depths are accessed by acoustic releases or remotely operated vehicles.

Fish Movement Data

Since June 2004, a total of 52 sheephead (both male and female) and 50 kelp bass have been tagged and tracked at Anacapa Island. While the project is ongoing, the results to date have been very interesting. All of the sheephead and 93 percent of the kelp bass released inside the state marine reserve have remained in the reserve. Further, up to 70 percent of male sheephead and 33 percent of kelp bass released outside the reserve have been recorded inside the reserve on a regular basis.

The acoustic tracking data have also revealed other little-known aspects of fish behavior. For example, from July 2004-January 2005 an adult male sheephead was found to spend most of his time near where he was caught and released, within the inner ring of receivers. However, he made periodic movements to the outer ring



James Lindholm installs a PIER acoustic receiver on the ocean floor.

of receivers in deeper water. While it had been assumed that large male sheephead only occupy specific territories during spawning season, this fish ventured into deeper water on several occasions for multiple days.

A National Effort

As part of a large meta-ecological study, James Lindholm has similar acoustic tracking projects under way at Stellwagen Bank National Marine Sanctuary and Florida Keys National Marine Sanctuary. The National Marine Sanctuary Program supports this research with mini-grants, education and outreach efforts, and assistance with servicing the acoustic array. Ultimately, tracking fish movements at multiple sanctuaries will offer insights into the effectiveness of marine reserves for conservation and management.

The PIER project in the Channel Islands will finish collecting data in fall 2006, with data analysis and reporting expected in 2007. For more information, visit www.pier.org

Jonna Engel was formerly a Marine Reserves Outreach Specialist at the sanctuary.

New Collaborative Research Projects

With support from the Channel Islands Marine Sanctuary Foundation, the Collaborative Marine Research Program (CMRP) fosters partnerships that bring stakeholders together in cooperative marine research, resource assessment, and protection. Since its founding in 2001, the program has brought scientists and fishermen together to investigate resource management questions in the sanctuary.

Oversight is provided by a planning committee composed of marine researchers, recreational and commercial fishermen, Sea Grant Extension marine advisors, and the following resource management agencies: the sanctuary, Channel Islands National Park, National Marine Fisheries Service, and California Department of Fish and Game.

Recent Proposals

In July 2005, the program issued a request for proposals, seeking projects that would evaluate marine protected areas. The request focused on two types of projects: collaborative research on fishing effects in Channel Islands marine protected areas; and education and outreach to inform the public about marine protected areas and/or research. Up to \$90,000 in funds was made available. Several funded projects are currently under way and scheduled for completion in 2007 (see project descriptions below).

In addition, the planning committee hired a project manager, Donna Schroeder of UC Santa Barbara's Marine Science Institute, to work with the project leaders, individuals, and organizations involved in the collaborative research and to submit funding proposals to increase program support.

Funded Projects

Marine Protected Area Benefits for Recreational Fishers of Calico Bass

Project Leaders: David Bacon, Patricia Halpin, andCarolynn Culver

Fishing Partners: Joel Greenburg, Dan Fink, Ramona Lisa McFadyen, and Tiffany Vague

Several marine protected areas were formerly prized fishing grounds



© Ramona Lisa Photography



© Ramona Lisa Photography

Left: The Scorpion Anchorage Marine Protected Area at Santa Cruz Island provides ideal habitat for calico bass. Right: Fisheries biologist Patti Halpin of UC Santa Barbara's Marine Science Institute measures and tags a calico bass before releasing it to the same location where it was caught.

for calico (kelp) bass (*Paralabrax clathratus*). Recreational fishermen and scientists are working on a tagging project to determine whether calico bass within a reserve move to areas outside a reserve. This project will help evaluate the benefits of marine protected areas for this species. The project aims to tag at least 400 fish at two sites, one off Santa Cruz Island and the other off Anacapa Island. Recovery of tagged fish will involve the California Recreational Fishery Survey, local fishing and diving groups, and PISCO (Partnership for Interdisciplinary Studies of Coastal Oceans).

Variation in Larval Supply Inside and Outside Marine Protected Areas within the Channel Islands National Marine Sanctuary

Project Leaders: Mark Page, Stephen Schroeter, Jennifer Dugan, andCarolynn Culver

Fishing Partners: Bruce Steele, Rick Gutierrez, and Harry Liquornik

Many marine animals of commercial, recreational, and ecological importance (e.g., sea urchins, rock scallops, rock crabs) have a two-phase life cycle. The more conspicuous and familiar life stage on the bottom is preceded by a nearly invisible planktonic larval stage that floats in the

water column for days to weeks. Changes in the populations of marine animals may be related to the supply of these tiny larvae. Fishermen and researchers from UC Santa Barbara's Marine Science Institute and the UC Sea Grant Extension Program are comparing the larval supply of invertebrates inside and outside marine protected areas at Santa Cruz and Santa Rosa islands.

Goleta Pier, A Platform for Education and Conservation

Project Leaders: Ken Jones and Boyd Grant

This education and outreach program is designed to develop and test educational/outreach materials about conservation-oriented pier and shore fishing practices as well as marine protected areas. Under the supervision of adult mentors and scientists, young anglers will enjoy a full day's fishing, documenting their catches while learning about species, regulations, and pier fishing etiquette. Educational materials will be reviewed by UC scientists, sanctuary staff, and the California Department of Fish and Game. The project is sponsored by United Pier and Shore Anglers of California, a statewide nonprofit dedicated to improving the pier and shore environment for California anglers.

Aerial Monitoring Data for 2005

By Natalie Senyk and Ben Waltenberger

The Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP) conducts mammal and vessel surveys as well as marine reserve enforcement flights within the sanctuary. Flights utilize NOAA-64, a Lake Renegade Amphibian aircraft piloted by sanctuary Executive Officer Julie Helmers. Staff use a laptop computer integrated with the aircraft's Global Positioning System (GPS) to record locations and activities of marine mammals and vessels.

SAMSAP survey flights comprised 26 of the 49 missions NOAA-64 flew in 2005. The surveys recorded a combined total of 849 observations of vessels and organisms. This data contributes to research and monitoring programs both inside and outside marine reserves.

Biological Observations

Six species of cetaceans and fish were recorded in 2005, with a combined total of 3,945 individuals. Listed in order of numbers observed (greatest to least) these were:

- Common dolphin (*Delphinus delphis*): 3,723
- Risso's dolphin (*Grampus griseus*): 158
- Gray whale (*Eschricus robustus*): 30
- Humpback whale (*Megaptera novaengliae*): 12
- Blue whale (*Baleanoptera musculus*): 5
- Ocean sunfish (*Mola mola*): 1

Common dolphins accounted for 94.4 percent of all cetacean sightings.



Common dolphins (*Delphinus delphis*).

Distribution of Vessels

There were 1,266 vessels observed during the 26 survey flights in 2005. Of the total, 94.2 percent were observed within the three nautical mile state waters boundary, and 5.8 percent were observed in federal waters (three to six nautical miles from island shorelines). Table 1 breaks down sightings by general activity type as well as state and federal waters. Figure 1 displays the spatial distribution of vessels sighted during the 2005 surveys.

Natalie Senyk is Scientific Advisor and Ben Waltenberger is Physical Scientist at the sanctuary.

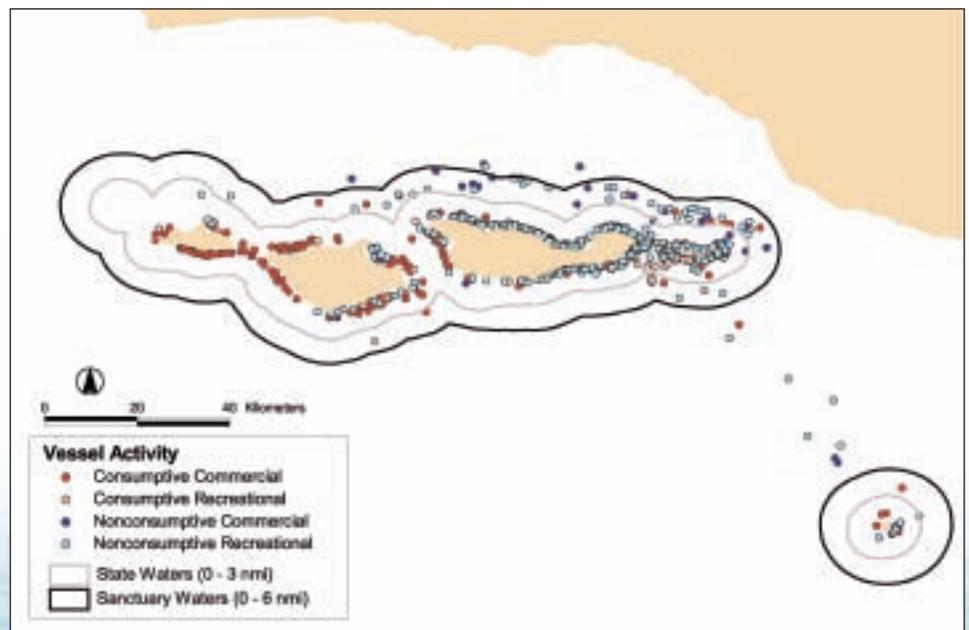


Humpback whales (*Megaptera novaengliae*).

Table 1. Vessel Activity in Sanctuary Waters, 2005

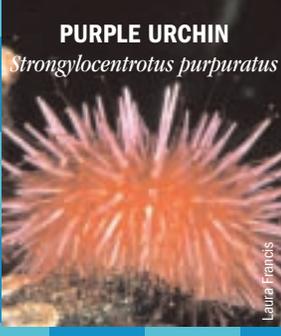
VESSELS			ACTIVITY TYPE			
Sanctuary Waters	Number of Vessels	Percent of Observed Vessels	Commercial Fishing/Diving	Recreational Fishing/Diving	Nonconsumptive Commercial	Nonconsumptive Recreational
State Waters (Shoreline out to 3 NM)	1192	94.2%	384	193	15	600
Federal Waters (3 NM-6 NM)	74	5.8%	15	7	14	38
Total	1266	100.0%	399	200	29	638

Figure 1. Spatial Distribution of Sanctuary Vessel Activity, 2005



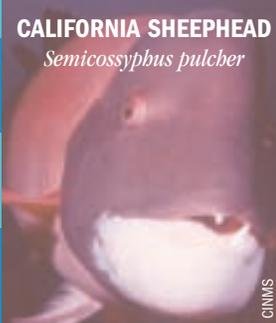
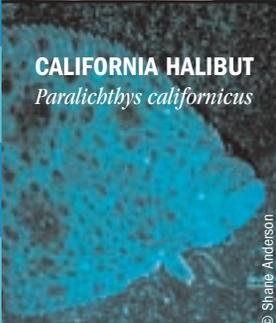
Species of Interest in the Channel Islands

These examples represent marine species that may benefit from the presence of marine reserves in sanctuary waters.

Species	Distribution & Habitat	Life History Patterns	Status & Significance	Ecological Links
 <p>GIANT KELP <i>Macrocystis pyrifera</i></p> <p>© Kip Evans</p>	<p>Central California to Baja California</p> <p>Giant kelp prefers depths under 130 feet, water temperatures under 68 degrees F, and rocky bottoms.</p>	<p>Giant kelp has a two-stage life cycle. Sporophytes generate spores that develop into male and female gametophytes. Once fertilized, female gametophytes grow into the familiar, canopy-forming plant.</p>	<p>This commercially important, habitat-forming species supports many other species. Its presence positively affects the diversity and density of fish populations, including rocky inshore fish.</p> <p>A declining trend is evident in the Southern California giant kelp canopy.</p>	<p>Giant kelp provides other species with foraging grounds, nursery grounds, and refuge from predators.</p> <p>Foraging species include red and purple urchins, opaleye, halfmoon, and abalone. Nursery and habitat species include cnidarians, lingcod, surfperch, kelp rockfish, and white sea bass.</p>
 <p>EELGRASS <i>Zostera spp.</i></p> <p>© Penny Owens</p>	<p>Alaska to Baja California</p> <p>Eelgrass prefers protected, sandy areas. Eelgrass beds within the Santa Barbara Channel are entirely subtidal.</p>	<p>This flowering marine plant grows from rhizomes in soft bottom sediment. It spreads by seed production and asexual propagation.</p> <p>After the 1983 El Nino, white urchins eliminated eelgrass beds around the Channel Islands. Restoration efforts are under way at Anacapa and Santa Cruz islands.</p>	<p>This habitat-forming species is highly susceptible to disturbances like increased sediments, reduced light penetration, and non-native invasive species.</p> <p>Eelgrass beds collect and recycle nutrients that would otherwise be transported offshore.</p>	<p>Eelgrass beds provide a refuge for larval, juvenile, and adult fish. Juvenile lingcod and white sea bass forage and hide in eelgrass beds. Diving birds and mollusk-eating birds forage there also.</p>
 <p>CALIFORNIA SPINY LOBSTER <i>Panulirus interruptus</i></p> <p>© Shane Anderson</p>	<p>Central California to Baja California</p> <p>California spiny lobsters are found in the low intertidal zone to 200 feet. They live in rocky areas, sheltering under rocks and in crevices and caves by day and emerging at night. Juveniles spend their first two years in surfgrass beds.</p>	<p>Larvae drift offshore up to 350 miles, changing into juveniles. Then they swim inshore and settle. Much of the population makes a yearly offshore-onshore migration stimulated by changes in water temperature. In winter, individuals are found at depths over 50 feet. In spring, they move to warmer, shallower water.</p>	<p>This species is commercially and recreationally important.</p> <p>The lobster fishery is strongly influenced by the weather, such as warming and cooling of water temperature due to El Niño and La Niña events.</p>	<p>California spiny lobsters feed on sea urchins, abalone, clams, algae, and fish.</p> <p>Their predators include sheephead, cabezon, kelp bass, octopuses, California moray eels, horn sharks, leopard sharks, rockfish, and giant sea bass.</p>
 <p>WHITE ABALONE <i>Haliotis sorenseni</i></p> <p>© NMMS</p>	<p>Point Conception to Baja California. Mostly found at the Channel Islands.</p> <p>White abalone are found in subtidal zones at depths of 80-230 feet in open, exposed areas.</p>	<p>White abalone spawn in the winter. Larvae may only occasionally reach adulthood. Successful reproduction depends, in part, on population density.</p>	<p>Historically, this species was commercially important. It has exhibited a rapid decline, and there is concern that it may become extinct.</p> <p>It is the first invertebrate to be listed as an endangered species.</p>	<p>White abalone feed on red, brown, and green algae, including giant kelp.</p> <p>Their predators include sea stars, octopuses, crabs, lobster, and fish like sheephead and cabezon.</p>
 <p>PURPLE URCHIN <i>Strongylocentrotus purpuratus</i></p> <p>© Laura Francis</p>	<p>Vancouver Island to Baja California</p> <p>Purple urchins are common in subtidal zones to 525 feet, lower intertidal zones on rocky shores, and on pilings in areas of moderate to strong wave action.</p>	<p>Purple urchin larvae live in the open sea. They may disperse far from the adults that spawned them. Larvae eventually settle and change into bottom-dwelling juveniles.</p>	<p>Fishing for sea urchin predators and competitors may increase grazing of kelp by urchins. This leads to areas with excessive urchin populations known as "urchin barrens."</p>	<p>Purple urchins feed on brown and red algae, particularly giant kelp.</p> <p>Their predators include sea stars, fish like California sheephead, spiny lobsters, and the southern sea otter.</p>

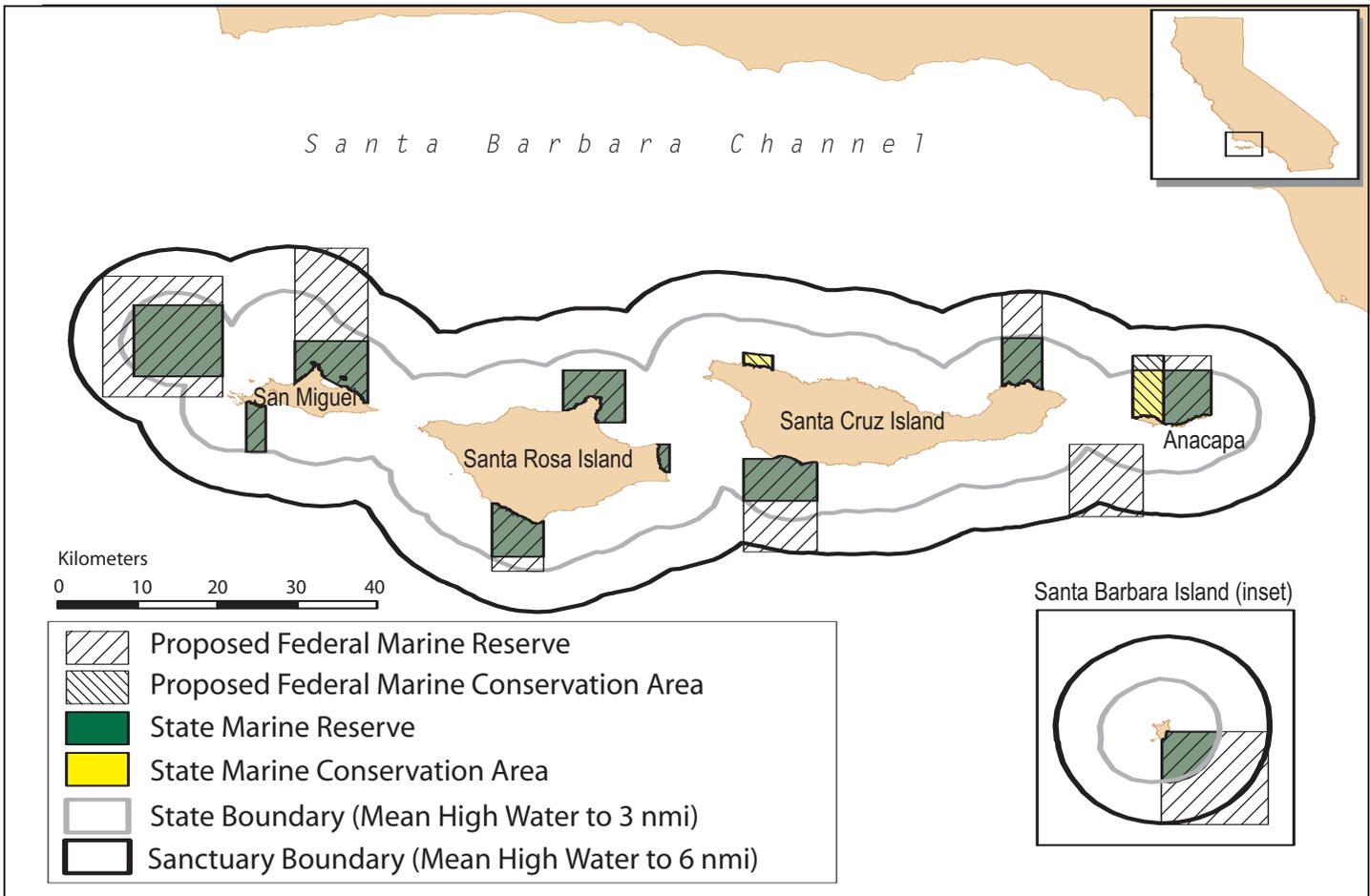
Species of Interest in the Channel Islands

For more information, visit <http://channelislands.noaa.gov> and www.marinelife.noaa.gov

Species	Distribution & Habitat	Life History Patterns	Status & Significance	Ecological Links
 <p>CALIFORNIA SHEEPHEAD <i>Semicossyphus pulcher</i></p> <p>CINMS</p>	<p>Monterey Bay to Northern Central Baja California and Gulf of California</p> <p>California sheephead live on rocky bottoms, especially near kelp beds. They occupy subtidal zones to 300 feet, but adults and juveniles usually stay at 3-30 feet.</p>	<p>California sheephead spawn from July-September. Each individual is hermaphroditic, functioning first as a female but then changing to a male between five and 13 years old. They can live up to 21 years.</p> <p>Size: 1-2 feet, maximum 3 feet.</p>	<p>This species is commercially and recreationally important. Populations off southern California have declined because of fishing pressure and reduced kelp beds.</p>	<p>California sheephead use their strong teeth to feed on hard-shelled organisms like crabs, barnacles, mollusks, spiny lobsters, sea urchins, and abalone.</p> <p>Their predators include sea lions, seals, and giant sea bass.</p>
 <p>BOCACCIO <i>Sebastes paucispinis</i></p> <p>© Dorina Schroeder</p>	<p>Kodiak Islands to Central Baja California</p> <p>The young live under drifting kelp mats in shallow water, 30-100 feet. Adults are found over rocky reefs at depths from 60-1,640 feet.</p>	<p>Bocaccio spawn from October-July. Females produce living young rather than eggs. Larvae live in the open sea. Juveniles settle to the bottom in shallow water. They swim into deeper water as they grow.</p> <p>Size: 8-28 inches, maximum 3 feet.</p>	<p>Historically, this species was commercially and recreationally important. It has exhibited a significant long-term decline. The National Marine Fisheries Service has declared the species as overfished.</p>	<p>Bocaccio feed mainly on surfperch, jack mackerel, sablefish, anchovies, squid, octopus, and crab.</p> <p>Predators of adult bocaccio are marine mammals like harbor seals.</p>
 <p>CALIFORNIA HALIBUT <i>Paralichthys californicus</i></p> <p>© Shane Anderson</p>	<p>Northern Washington to Southern Baja California</p> <p>California halibut live on sandy bottoms near reefs, rocks, or kelp holdfasts. They are found beyond the surf line to depths of 180 feet.</p>	<p>Most larvae are found at depths less than 260 feet. Adult California halibut move inshore and aggregate to spawn and feed from February-June. They disperse offshore in fall.</p> <p>Size: 15-30 inches, maximum 5 feet.</p>	<p>This species is commercially and recreationally important.</p>	<p>Juvenile California halibut feed on tiny crustaceans such as copepods and amphipods. Adults feed primarily on squid, northern anchovies, and Pacific sardine.</p>
 <p>XANTUS'S MURRELET <i>Syntliboramphus hypoleucus</i></p> <p>CINMS</p>	<p>Northeast Pacific, including Anacapa and Santa Barbara islands. The Channel Islands have almost half of the world's breeding population. Nesting occurs from February-June.</p> <p>Xantus's Murrelets form nesting colonies on rocky islands, ledges, and sometimes in dense vegetation.</p>	<p>Xantus's Murrelets spend most of their lives at sea. They nest onshore in crevices on steep slopes and in sea caves. Their nesting activities are nocturnal.</p>	<p>This species has exhibited a long-term decline and is listed as threatened by the State of California. Human-related activities, like night fishing lights and the introduction of rats at the Channel Islands, have had a detrimental impact on the population.</p>	<p>Xantus's Murrelets feed mostly on fish, especially anchovies and fish larvae, and also small crustaceans.</p> <p>Predators include deer mice, barn owls, western gulls, rats, feral cats, and peregrine falcons.</p>
 <p>NORTHERN FUR SEAL <i>Callorhinus ursinus</i></p> <p>© National Marine Mammal Laboratory</p>	<p>Japan to Bering Sea and Southern Alaska to San Diego, including San Miguel Island</p> <p>Northern fur seals live in coastal waters, open ocean, and freshwater areas.</p>	<p>Northern fur seals breed on islands, including San Miguel Island at Castle Rock and Adams Rock. Breeding season is from late spring to July. Pups are weaned at four months. Winter foraging grounds are 10-100 miles offshore.</p>	<p>This species has exhibited a long-term decline and is listed as depleted.</p> <p>The San Miguel population is the remnant of a much larger population that existed in the early 1800s.</p>	<p>Northern fur seals feed on northern anchovy, Pacific whiting, juvenile rockfish, and squid.</p>

Marine Reserves—Federal Phase

By Allison Chan



NOAA is proposing to extend the state's nearshore marine zones into deep water habitats of the sanctuary. The proposed federal marine reserve and conservation area extensions would encompass approximately 232 square nautical miles, protecting both nearshore and offshore sanctuary habitats.

Two types of zones are proposed. In marine reserves, any extractive activities (such as fishing) or injury to sanctuary resources would be prohibited. In marine conservation areas, some lobster fishing and recreational fishing for pelagic species would be allowed, while other extractive activities would be prohibited.

Public Comment Period

As part of the 60-day public comment period scheduled to begin on August 11, the sanctuary will hold public hearings to take comments on the draft environmental impact statement (DEIS). Hearings will be held at the following dates and locations:

- September 26, 2006, 6-9 p.m., Four Points Sheraton, Ventura, CA
- September 28, 2006, 6-9 p.m., Earl Warren Showgrounds, Santa Barbara, CA

Other Opportunities for Input

- E-mail: CINMSReserves.DEIS@noaa.gov. Include in the subject line: Proposed marine reserves in CINMS.
- Federal e-Rulemaking Portal: <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Mail: Sean Hastings, Channel Islands National Marine Sanctuary, 113 Harbor Way, Suite 150, Santa Barbara, CA 93109.
- Fax: (805) 568-1582

Background Information

Copies of the DEIS, proposed rule, and initial regulatory flexibility analyses may be obtained from the sanctuary web site at <http://channelislands.noaa.gov/> or by writing to Sean Hastings at the address above or via e-mail: Sean.Hastings@noaa.gov.

The deadline for receiving public comments is October 10, 2006.

Allison Chan is an intern at the sanctuary.

Protecting the Channel Islands Together

By NPS Staff, Roland Takayama, and Sean Hastings

Effective management of the Channel Islands National Marine Sanctuary requires an enforcement presence. The sanctuary, NOAA, National Park Service, U.S. Coast Guard, and State of California work together to protect the Northern Channel Islands and Santa Barbara Island.

The sanctuary relies on its state and federal partners to aid in enforcing sanctuary regulations. In addition, each agency has its own regulations to enforce. Cooperation between Park Service rangers, State Fish and Game wardens, Coast Guard personnel, and NOAA's Office of Law Enforcement helps make the most effective use of resources. For example, rangers routinely fly patrols with Coast Guard helicopter crews, and rangers often team up with wardens on the water. Similarly, when a vessel runs aground, the agencies strive for a coordinated response to safeguard lives, property, and the environment.

The new mission of protecting marine reserves has further strengthened the cooperative enforcement relationship. The sanctuary and NOAA salute our partners for their role in providing a safe and sound Channel Islands experience.

National Park Service

Park service rangers are federal law enforcement officers charged with protecting both park resources and the public. They ensure that the public follows federal regulations on the islands and state fishing regulations on surrounding waters. Along with enforcement, they emphasize resource education. Park rangers as well as Fish and Game wardens distribute literature like the "Protecting Your Channel Islands" brochure produced and funded by the sanctuary.

The park serves as the most frequent enforcement presence in marine reserves, with rangers stationed at each island. Several islands have patrol boats on site. A new patrol unit consists of three rangers whose primary duty is marine surveillance, and a new boat with long-range capabilities will soon improve enforcement at marine protected areas.

State of California

The California Department of Fish and Game (DFG) manages the state's fish, wildlife, and plant resources for their ecological value and for their use and enjoyment by the public. DFG's Wildlife Law Enforcement Branch supplies enforcement, education, support, guidance, and timely response to sanctuary information and service requests. DFG wardens are cross-deputized with federal enforcement authority from the U.S. Fish & Wildlife Service and NOAA. They enforce sanctuary, state, and federal fisheries regulations, maintaining the integrity of marine protected areas. The Office of Spill Prevention and Response (OSPR) responds to oil spills in the sanctuary from illegal discharges or vessel groundings.

Utilizing a fleet of vessels, including the 45-foot patrol



© John Suchill

Channel Islands National Park Rangers inspect divers inside the Painted Cave State Marine Conservation Area.

boat *Swordfish* and the 24-foot *Gordan Lynn*, DFG wardens are a regular presence at the Northern Channel Islands. The *Swordfish's* sister ships *Cobo* and *Thresher* offer additional support, especially at remote Santa Barbara Island. A Partenavia aircraft provides aerial surveillance.

U.S. Coast Guard

Coast Guard personnel regularly patrol the Santa Barbara Channel with 87' Cutters stationed at Santa Barbara and Channel Islands harbors, plus Los Angeles-based helicopter crews. They assist the state with marine reserves enforcement and NOAA with fishing and sanctuary enforcement. The Coast Guard ensures responsible boating practices and is the on-scene federal coordinator for oil spills, vessel groundings, and search and rescue operations.

This article was co-authored by National Park Service staff; Roland Takayama, Patrol Captain at the California Department of Fish and Game; and Sean Hastings, Resource Protection Coordinator at the sanctuary.



California Department of Fish and Game wardens use the patrol boat *Swordfish* to enforce regulations around the Channel Islands.

© John Suchill

Management and Research Highlights, July 2005–July 2006

Sanctuary 25th Anniversary

On September 29, 2005, the sanctuary celebrated its 25th anniversary at the Santa Barbara Zoo. Over 250 guests attended this event. Activities included presentation of the Channel Islands Naturalist Corps Volunteer of the Year award to Warren Glaser; Sanctuary Advisory Council Volunteer Award to Matt Cahn; and recognition of all sanctuary volunteers by Assemblyman Pedro Nava.

Throughout the evening, winning images from the 25th Anniversary photo contest were on display. Sanctuary Advisory Council member Jim Knowlton and Sanctuary Volunteer Ingrid Lantz provided a beautiful and inspiring slide show set to music.

On October 7, 2005, the National Marine Sanctuary Foundation, Channel Islands Marine Sanctuary Foundation, and the sanctuary coordinated a 25th Anniversary Gala Fundraiser at the Four Seasons Biltmore in Santa Barbara. Jean-Michael Cousteau served as emcee. Congresswoman Lois Capps and Governor Arnold Schwarzenegger were honored with the National Marine Sanctuary Foundation's Stewardship Award. Jean and Barry Schuyler and Captain Fred Benko received the National Marine Sanctuary Foundation's Lifetime Achievement Award.

Speakers included National Marine Sanctuary Program (NMSP) Director Dan Basta and Sanctuary Superintendent Chris Mobley. Attendees enjoyed several short films displaying the magic



Robert Schwemmer

Attendees at the 25th Anniversary Gala Fundraiser included, from left: California Secretary for Resources Mike Chrisman, Captain Fred Benko, Emcee Jean-Michael Cousteau, Jean and Barry Schuyler, and Sanctuary Superintendent Chris Mobley. Captain Benko and the Schuylers received the National Marine Sanctuary Foundation's Lifetime Achievement Award.

and magnificence of the Channel Islands and the other national marine sanctuaries around the country. A silent auction yielded \$10,000 in donations to the two foundations. In all, this event raised \$36,000 to support the ongoing work of the Channel Islands Marine Sanctuary Foundation and the National Marine Sanctuary Foundation.

Management Plan Update

On May 15, 2006 NOAA released the Channel Islands National Marine Sanctuary's Draft Management Plan and Draft Environmental Impact Statement for public review and comment. The result of several years of study, planning, and community input, this document charts a course to protect the sanctuary's marine ecosystems while allowing for compatible human uses.

The Draft Management Plan (Vol. I), a major revision of the sanctuary's original 1983 management plan, addresses public awareness and understanding, conservation science, water quality, emergency response and enforcement, emerging issues, maritime heritage resources, sanctuary operations and performance evaluation.

The Draft Environmental Impact Statement (Vol. II) analyzes alternatives for modified and new regulations. Proposed changes clarify and strengthen protections for marine habitats, sensitive species, water quality, and submerged cultural and historic resources.

It is important to note that the Draft Management Plan does not propose establishing marine reserves (no-take areas) or marine conservation areas (limited-take areas) within the sanctu-



Robert Schwemmer

State Assemblyman Pedro Nava paid tribute to sanctuary volunteers.



Robert Schwemmer

Guests gathered at the Santa Barbara Zoo to celebrate the sanctuary's 25th anniversary.



Robert Schwemmer

Matt Cahn (center), recipient of the SAC Volunteer Award, with sanctuary staff members Michael Murray and Julie Bursek.

ary; that action is being considered as part of a separate NOAA environmental review and public process. In addition, the Draft Management Plan does not propose a sanctuary boundary change, but rather calls for continuing a scientifically based public process that will lead to sound decisions about boundary changes in the future.

During the public review period (May 15 through July 21) many community members took the opportunity to review the plan. On June 27 and 29, approximately 65 people attended public hearings. Their comments were thoughtful and varied, including concerns about and support for motorized personal watercraft regulations, suggestions on improving modifications to the sanctuary's discharge regulations, ideas for action plans on water quality and emerging issues, text clarifications, and program ideas regarding Chumash culture. Written comments have been equally varied and helpful.

Sanctuary staff are addressing all comments received and preparing responses to be incorporated in the Final Management Plan and Final Environmental Impact Statement. The final plan and updated regulations will benefit greatly from the comments received from the public, the Sanctuary Advisory Council, and the sanctuary's many partners. The final documents are scheduled for completion in early 2007.

More information about the management plan is available at <http://channelislands.noaa.gov>.

Sanctuary Advisory Council

In September 2005, the Sanctuary Advisory Council adopted recommendations from the Conservation Working Group regarding water quality. These recommendations have accelerated the sanctuary's efforts to develop a water quality protection program as called for in its Draft Management Plan. For a water quality report, see <http://www.channelislands.noaa.gov/sac/news.html>.

In 2005, council members contributed 1,121 hours of service to the sanctuary. The council's 2005 annual report and 2006 work plan are posted at http://www.channelislands.noaa.gov/sac/report_doc.html.

Outreach Center for Teaching Ocean Science

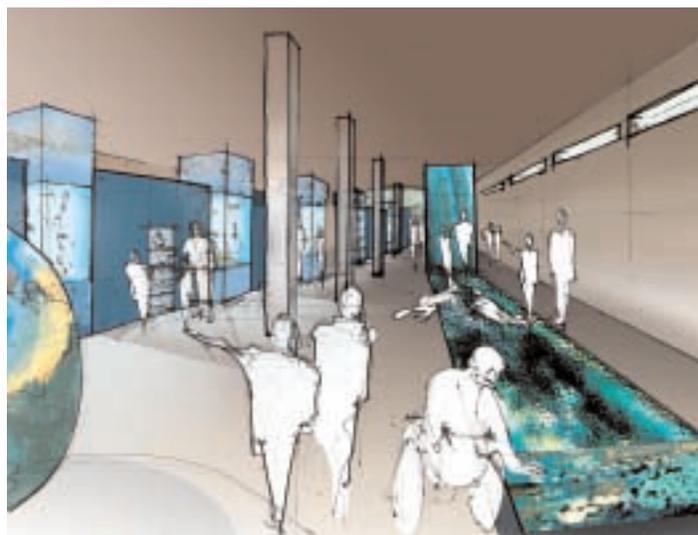
The sanctuary and UC Santa Barbara are collaborating on a new campus facility that will hold the Outreach Center for Teaching Ocean Science (OCTOS) as well as the headquarters office space for 26 sanctuary staff.

OCTOS will offer hands-on educational programs to K-12 and adult audiences. Focused on the Channel Islands marine ecosystem, the facilities will likely include an environmental simulator, a study aquarium, and a virtual submarine. The primary outreach activity will be class field trips accommodating up to 180 students per day. The center is scheduled for completion in 2009.

Research and Monitoring

Sanctuary staff have developed the 2005 Research Summary, available at <http://channelislands.noaa.gov>.

In 2005-06, the R/V *Shearwater*, *Xantu*, and Lake



The Outreach Center for Teaching Ocean Science is being designed as a "green building." Construction is slated to begin in 2007.

Renegade Sea Wolf aircraft have provided ongoing support for marine reserves monitoring projects as well as other research projects. Some of these projects and partners include:

- Partnership for Interdisciplinary Studies of Coastal Oceans/UC Santa Barbara Marine Science Institute: SCUBA surveys
- US Geological Survey: Sidescan sonar operations
- Plumes and Blooms, UC Santa Barbara: Ocean water data collection
- California Department of Fish and Game/Marine Applied Research and Exploration: Remotely operated vehicle cruises
- Channel Islands National Park: Kelp forest monitoring and rocky intertidal monitoring
- U.S. Fish and Wildlife Service: Ashy storm-petrel monitoring
- Monterey Bay National Marine Sanctuary: Subtidal surveys, rockfish assessments, jellyfish surveys
- Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP): Aerial marine reserves monitoring
- California Institute of Environmental Studies: Xantus's Murrelet monitoring

Xantus's Murrelet Monitoring

Seabird biologists from the California Institute of Environmental Studies completed their seventh year of Xantus's Murrelet monitoring on Anacapa Island in 2006. This California state threatened species breeds on only 12 islands. The survival of the Anacapa colony was threatened by predatory non-native black rats, eradicated in 2002 as part of the Anacapa Island Restoration Program (sponsored by the *American Trader* Trustee Council with support from the sanctuary and Channel Islands National Park). Though abnormal oceanographic conditions produced late breeding this year, the number of nests matched previous years and no signs of predation were found.

Maritime Heritage Highlights, July 2005-July 2006

Resource Protection

The sanctuary's annual shipwreck reconnaissance expedition took place aboard the R/V *Shearwater* from October 17-21, 2005. Expedition members included divers from the sanctuary, Channel Islands National Park, and Coastal Maritime Archaeology Resources. Archaeological investigations included further documentation of a Grumman AF-2W Guardian airplane lost off Santa Cruz Island and site evaluation of the F/V *Reliance* lost at Santa Rosa Island. The third site recorded was the *Aggi*, a three-masted, full-rigged sailing ship lost 90 years ago off Santa Rosa Island.

The dive team spent the majority of the expedition at the *Aggi* site, adding one additional datum monitoring station and geo-referencing the existing five datums installed in 2004. The permanent datums allowed for accurate measurements of major artifacts during a second five-day expedition to the site from November 14-18, 2005 aboard the National Park Service's R/V *Pacific Ranger*.

The shipwreck reconnaissance program at the Channel Islands has been an ongoing collaboration between the sanctuary, National Park Service, Coastal Maritime Archaeology Resources, and the State of California for nearly 25 years. The 2006 expedition will feature continued mapping of the *Aggi* site plus installation of additional datums at the *Goldenhorn* and *Cuba* sites during one five-day expedition aboard the R/V *Shearwater* and one five-day expedition aboard the R/V *Pacific Ranger*.

Education and Outreach

The sanctuary's shipwreck exhibits at the Santa Barbara Maritime Museum received upgrades in summer 2005. Exhibit contractor Moments In Time installed a new diorama of Anacapa Island and added elements to the R/V *Shearwater* and *Cuba* models.



Charles Lara, deckhand of the sanctuary vessel R/V *Shearwater*, surveys the *Aggi* shipwreck along with a California sheephead (*Semicossyphus pulcher*).



Archaeologist Kelly Minas of Channel Islands National Park installs a datum at the *Aggi* shipwreck site during the shipwreck reconnaissance expedition in October 2005.

A sanctuary presentation to new docents and staff of the Santa Barbara Maritime Museum highlighted the sanctuary's maritime history, the maritime heritage program, and the archaeological work under way at several shipwreck sites. The docents also received public interpretation training for the *Cuba* and underwater archaeology exhibits.

Web-Based Projects

In fall 2005, sanctuary staff completed an online history of the four-masted schooner *Watson A. West*, lost off San Miguel Island in February 1923. The schooner was carrying 800,000 board feet of lumber from Gray's Harbor, Washington to San Pedro, California when the vessel struck the west end of the island, breaking apart immediately. Captain Ludwig M. W. Sorensen had only time to secure a chart, chronometers, and a compass during the hasty evacuation. The crew scrambled into the ship's lifeboat and rowed for 18 hours, finally reaching Santa Barbara. The wreckage of the *Watson A. West* has not yet been located, although it is believed to be somewhere near Point Bennett. <http://www.channelislands.noaa.gov/cr/watsonawest.html>

The West Coast Shipwreck online curriculum is being redesigned to help students, teachers, and researchers navigate more easily through the database, and to complete position coordinates for GIS activities. <http://channelislands.noaa.gov/shipwreck/shiphome.html>.

Annual Tomol Crossing

On September 10, 2005, the sanctuary vessel *Xantu* supported a group of Chumash paddlers as they made their annual crossing from Channel Islands Harbor to Santa Cruz Island. They completed the crossing in approximately 11 hours. When the tomol landed, it was welcomed by over 100 cheering members of the Chumash community singing traditional songs on the beach.



Robert Schwemmer

A Delta submersible surfaces during a shipwreck expedition in the sanctuary. This image by Robert Schwemmer won first place in the Society for Historical Archaeology's 2006 photography competition.

Publications

Photographs of the September 11, 2004 tomol crossing captured by Maritime Heritage Coordinator Robert Schwemmer have appeared in two publications: a book for young readers titled *We The People – The Chumash and Their History* by Natalie M. Rosinsky (Compass Point Books, 2005); and an article titled "The Crossing" by Julie Cordero-Lamb that appeared in *MAINS'L HAUL*, a journal of the Maritime Museum of San Diego. The *Union Tribune* in San Diego also published some of the images in their science section. A new web page currently under development will feature the photos along with articles by Roberta Cordero (Chumash Maritime Association) and Georgiana Valoyce Sanchez (Elder, Barbareno Chumash Council).

In addition, photographs of the *Irving Johnson*, a brigantine that struck a sandbar while entering the Channel Islands Harbor in March 2005, appeared in *Professional Mariner* and *Sea Magazine*, as well as on the cover of *Sea History*.

In spring 2006, Schwemmer authored an article titled "Shipwrecks That Built San Miguel Island" for the Santa Barbara Maritime Museum's journal *Maritime Currents*. The article documents the wrecking events of the vessels *Kate and Anna*, *J. M. Colman*, *Comet*, and *Cuba*.

America's Underwater Treasures

In winter 2005, the Ocean Futures Society used the R/V *Shearwater* as a platform during the filming of *America's Underwater Treasures*. The segment featured Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) divers conducting surveys off Anacapa Island, plus interviews with PISCO scientist Jenn Casselle and Jean-Michel Cousteau's son Fabien. Surface shots aboard the R/V *Shearwater* were directed and filmed by Bob Talbot. In addition, the production team working from the vessel *Condor Express* filmed several locations at the Channel Islands, including San Miguel Island. <http://www.oceanfutures.org/>



Robert Schwemmer

The Ocean Future Society's filming of *America's Underwater Treasures* aboard the R/V *Shearwater* featured interviews with Jean-Michel Cousteau's son Fabien and Jenn Caselle, a scientist with Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO).

Regional Maritime Heritage Program

In January 2006, Robert Schwemmer attended the Society for Historical Archaeology conference in Sacramento, California where he presented a paper on three California Gold Rush passenger steamers shipwrecked in 1853 and now located in three national marine sanctuaries: the *Tennessee* in Monterey Bay National Marine Sanctuary, the *S.S. Lewis* in Gulf of the Farallones National Marine Sanctuary, and the *Winfield Scott* in Channel Islands National Marine Sanctuary.

During the conference, the Advisory Council on Underwater Archaeology awarded Schwemmer both first and second place in its photography competition. The winning photographs featured a Delta submersible searching for shipwrecks in the sanctuary, and the shipwreck USS *Macaw* at Midway Atoll in the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. These images are featured on the council's web site, www.acuaonline.org.

National Maritime Heritage Program

The National Maritime Heritage Program has launched its new web site that features Channel Islands archaeological and cultural programs as well as expeditions conducted at other national marine sanctuaries. <http://sanctuaries.noaa.gov/maritime/>.

Renowned photographer Kip Evans is working on 12 web-based videos for NOAA and the National Geographic Society. The two to three-minute videos will highlight the National Marine Sanctuary Program in classrooms throughout the United States, with one of the videos highlighting Channel Islands shipwrecks.

For information on the specific shipwrecks discussed on these pages, visit the Shipwreck Database at <http://channelislands.noaa.gov/shipwreck/shiphome.html>

Education and Outreach Highlights, July 2005-July 2006

LiMPETS Workshops

A two-day Long-term Monitoring Program and Experiential Training for Students (LiMPETS) workshop was held September 20-21, 2005 at the Los Angeles County Outdoor Science School in Malibu upon the request of that school's director, Greg Achenbach, who had attended a West Coast LiMPETS workshop.

Sanctuary staff put together nine new LiMPETS sandy beach sampling kits and four new LiMPETS rocky intertidal sampling kits. The kits were distributed among seven organizations in Los Angeles, Ventura, and Santa Barbara counties that partner with the sanctuary in the LiMPETS program.

On April 22, 2006, sanctuary educational staff and representatives from UC Santa Barbara's Marine Science Institute surveyed Frenchy's Cove at Anacapa Island to set up a new rocky intertidal site for LiMPETS—the first such site established in the sanctuary. Eleven LiMPETS teachers and field biologists from Channel Islands National Park also participated in the survey. The site description is posted on the LiMPETS web site, <http://limpets.noaa.gov>.

Bay Watershed Education and Training (B-WET) Program

B-WET provides organizations with funds for environmental education throughout California. It is the first federally supported grant program to focus on Santa Barbara Channel watersheds in Santa Barbara and Ventura counties.

Up to \$350,000 in funds are available this fiscal year to implement environmental education projects in Santa Barbara and Ventura counties in two areas: meaningful outdoor experience for K-12 students, and professional development in environmental education for K-12 teachers.



Congresswoman Lois Capps and Sanctuary Superintendent Chris Mobley with students at the Sea Center's touch tank before the B-WET press conference.

Funding is available to K-12 public and independent schools and school systems, institutions of higher education, commercial and nonprofit organizations, state and local government agencies, and Indian tribal governments.

Sanctuary Education Coordinators Laura Francis and Julie Bursek were among 35 participants in the National Marine Sanctuary Program's B-WET grant writing workshop on January 20, 2006 in Santa Barbara. Also on that day, Congresswoman Lois Capps and sanctuary staff held a press conference at the Ty Warner Sea Center to highlight the B-WET grant announcement. Thirteen grant proposals were received, and seven were recommended for funding. Official funding announcements were expected in August 2006. For more information, contact seaberry.nachbar@noaa.gov.

Ocean Explorers

The three-year Ocean Explorers project, a partnership between the Center for Image Processing in Education and the sanctuary with funding from the National Science Foundation, will conclude this year. Sixty teachers from San Diego to San Francisco participated in this program and developed GIS lessons for their students. They helped teach a Mapping Oceans and Coasts workshop in Camarillo in July and presented their final projects in August at the Environmental Systems Research Institute Conference in San Diego. www.exploreoceans.org

ROV Field Trip

In February 2006, students and teachers from Cabrillo High School headed to the Channel Islands aboard the R/V *Shearwater* to test their remotely operated vehicles (ROVs). Students compared their ROVs to a SeaBotix ROV and learned how they are used in marine reserves research and monitor-



Ocean Explorers teachers participate in a field excursion aboard the R/V *Shearwater* as part of a Mapping Oceans and Coasts workshop in July 2006.



Rocio Lozano de Knowlton

MAD Magazine cartoonist Sergio Aragonés with MERITO Cartoon Contest winner Elise Pham, an 8th grader at Las Colinas Middle School in Camarillo.

ing. Activities included simulating an underwater transect, conducting water quality testing, and collecting plankton.

Channel Islands Naturalist Corps (CINC)

The Channel Islands Naturalist Corps (CINC) was lauded as a “role model for other sanctuaries” in a recent State of the Sanctuary report. The report can be read at <http://www.sanctuaries.noaa.gov/sos05/channelislands.html>. In addition, U.S. Senator Barbara Boxer signed a certificate of appreciation on June 1, 2006 that recognized CINC volunteers for their outstanding dedication to coastal stewardship.

The 120 CINC volunteers offer interpretation to passengers year round on whale watch trips aboard the *Condor Express*, *Double Dolphin*, and *Rachel G* out of Santa Barbara Harbor; *Island Packers* out of Ventura Harbor; and *Speed Twin* and *Ranger 85* out of Channel Islands Harbor. Working with Island Packers and Truth Aquatics, the volunteers lead interpretive hikes on Anacapa, Santa Cruz, Santa Rosa, and San Miguel islands. They conduct whale photo-identification research on the *Condor Express* for Cascadia Research Collective and assist with Channel Islands National Park’s underwater video program on Anacapa Island.

The CINC program is so successful that it may be expanded to include education and outreach for boaters, kayakers, and other sanctuary users.

Multicultural Education for Resource Issues Threatening Oceans (MERITO)

Targeting Spanish-speaking youth, educators, adults, migrant families, and community leaders, MERITO has brought sanctuary education materials to over 1,000 families in the past year at Hispanic community events. Outreach has included an informative booth, bilingual printed information, watershed model demonstrations, and the MERITO bilingual puppet show at Earth Day, the Water Science Exploratorium in Oxnard, and Dia de la Familia at the Santa Barbara Museum of Natural History.

In May 2006, 8th–12th grade students in Santa Barbara and Ventura counties participated in a MERITO cartoon con-



Courtesy Jackie Buhl

Former sanctuary research assistant Jackie Buhl used the *Alolkoy* and other educational materials to teach students in Peru about the Channel Islands.

test to create a strip with an environmental focus. Winning cartoonists received cash prizes, a trip to Santa Cruz Island aboard the R/V *Shearwater*, and a cartooning workshop by MAD magazine cartoonist Sergio Aragonés. A bilingual bus poster is currently being produced with the grand prize winner’s cartoon strip. Over 8 million passengers per year are expected to see and be inspired by its message.

In summer 2006, the sanctuary partnered with Channel Islands Marine Resources Institute and Oxnard College Marine Education Center to form the MERITO Academy. Sponsored by a B-WET grant for the 2006-2007 academic year, the academy will provide Hispanic-serving teachers and after-school program leaders with training, support, and resources to increase their students’ understanding of watershed and ocean issues—utilizing hands-on field and in-class activities while exposing them to careers in sciences. The MERITO Academy Educators Workshop for 5th-8th grade teachers is scheduled for October 13-14, 2006, with a follow-up day on February 3, 2007. For more information about MERITO, visit <http://channelislands.noaa.gov/edu/merito.html>

Product Updates

DVD: Exploring the Channel Islands National Marine Sanctuary

In summer 2005, the sanctuary released an upgrade of the “Exploring the Channel Islands National Marine Sanctuary” CD-ROM to a DVD edition. The DVD includes updated content, images, and videos from the sanctuary and is compatible with both Mac and PC operating systems. For more information contact laurafrancis@noaa.gov.

High Definition Film

The sanctuary is working with NOAA’s National Ocean Service Ocean Media Center to create a 20-26 minute video produced in high definition plus a 1-2 minute video trailer. This film will take viewers on a tour of the sanctuary and park and educate them about their unique ecosystems. Ocean literacy will be enhanced by learning about the formation of the islands and examining the interconnectivity of land and sea.

Marine Reserves Education

By Julie Bursek and Dan Powell

The waters surrounding the Channel Islands are some of the most biologically rich and economically vital areas off Southern California. An important role of sanctuary education and outreach is to help visitors understand the fragility of the ocean environment and their role in conserving it.

Needs Assessment and Matrix

In 2001-02, the Sanctuary Education Team (SET), a working group of the Sanctuary Advisory Council, conducted a needs assessment and developed a marine reserves education and outreach matrix. The matrix identified target audiences, outreach tools, and delivery methods to communicate information about marine reserves. Short-term goals emphasized reaching boaters and other on-the-water visitors to the sanctuary. Long-term goals included developing curriculum support tools and audiovisual materials for K-12 and university audiences.

Projects and Publications

One of the first projects was a marine reserves map for use in federal and state publications. Coordinated by the sanctuary, California Department of Fish and Game, NOAA Sea Grant, and Channel Islands National Park, the map has appeared in brochures, posters, signs, and web pages. (See page 3)

In 2003, a Sanctuary Advisory Council enforcement working group provided input for a regulatory brochure, "Protecting Your Channel Islands." This brochure highlights marine reserves in a user-friendly format. Other publications include a marine protected area brochure, a boating and safety brochure, and a marine reserves poster for K-12 schools.

Through its "Adopt-a-Business" Program, Channel Islands Naturalist Corps volunteers distribute marine reserves infor-

A REEF diver conducts fish and invertebrate surveys in the sanctuary.

© Carl Gwinn

Join the Sanctuary Education Team!

The Sanctuary Education Team (SET), a working group of the Sanctuary Advisory Council, is actively recruiting new members to help develop sanctuary education and outreach projects. Current projects include lesson plans for fifth grade students, speaker's bureau presentations for community groups, and a mainland-based unit of the Channel Islands Naturalist Corps. For contact information and a meeting schedule, please visit http://channelislands.noaa.gov/sac/wg_announce.html

mation to over 60 marine-related businesses every month, including tackle shops and boating supply stores.

Citizen Monitoring and Awareness

Citizen monitoring of marine reserves is an essential sanctuary outreach strategy, contributing data to help managers better protect the marine environment. Each year volunteer divers from REEF (Reef Environmental Education Foundation) join sanctuary staff aboard the R/V *Shearwater* to conduct fish surveys inside and outside marine reserves. To date, divers have logged more than 1,444 surveys, adding invertebrate surveys in 2006. For data, visit www.reef.org.

To increase public awareness of research and monitoring, the sanctuary and Channel Islands National Park cosponsor a free monthly lecture series, "From Shore To Sea," in Santa Barbara and Ventura. The speakers are scientific experts on the sanctuary's biological and cultural resources. For more information, visit www.channelislands.noaa.gov/focus/calendar.html

The sanctuary is also developing a marine reserves education web page. "Spotlight on a Scientist" features a biography of a marine reserves researcher, and "What I Did Over My Winter Break" provides project data and online student activities.

Long-Term Priorities

The sanctuary is currently addressing some of the long-term priorities identified by the Sanctuary Education Team matrix. In fall 2006, new signs will be installed at launch ramps in Santa Barbara, Ventura, and Channel Islands harbors to inform boaters about marine reserves. Additional signs at the Santa Barbara Zoo and Channel Islands National Park will highlight marine reserves' role in protecting ecosystems.

A new exhibit, "Follow That Fish," is under development for the Aquarium of the Pacific in Long Beach. Funded by NOAA's National Marine Fisheries Service, this exhibit will explain how acoustical tagging monitors fish inside and outside marine reserves. The exhibit will be part of the aquarium's "Southern California Kelp Forest" tank scheduled to open in 2007.

Julie Bursek is Education Coordinator at the sanctuary's Ventura County Field Office. Dan Powell is Education Alternate on the Sanctuary Advisory Council.

CALENDAR OF EVENTS

SEPTEMBER - OCTOBER

Warm weather, calm winds and seas are common in early fall.

Look for:

- Blue Whales** (*Balaenoptera musculus*)
- Fin Whales** (*Balaenoptera physalus*)
- Sei Whales** (*Balaenoptera borealis*)
- Red-Necked Phalaropes** (*Phalaropus lobatus*)
- Pink-Footed Shearwaters** (*Puffinus creatopus*)
- Sooty Shearwaters** (*Puffinus griseus*)
- Ashy Storm-Petrels** (*Oceanodroma homochroa*)
- Black Storm-Petrels** (*Oceanodroma melania*)
- Jellies of all kinds**



Ashy Storm-Petrel
(*Oceanodroma homochroa*)

- September 12 Shore to Sea Lecture Series: Chase Palm Park, Santa Barbara
- September 13 Shore to Sea Lecture Series: Channel Islands National Park Headquarters, Ventura
- September 16 22nd Annual Coastal Cleanup Day, 9 am-12 pm
Santa Barbara: Chase Palm Park Beach
Ventura: Emma Wood State Beach
- September 17-20 California and the World Ocean Conference, Long Beach, CA
<http://resources.ca.gov/ocean/cwo06>, cwo2006@completeconference.com, (916) 922-7032
- September 24 Seafest, Ventura Harbor, 11 am-5 pm
- October 1 Santa Barbara Zoo Fox Festival, Santa Barbara Zoo, 11 am-4 pm
- October 7 Oxnard Multicultural Festival, Oxnard
- October 10 Shore to Sea Lecture Series: Chase Palm Park, Santa Barbara
- October 11 Shore to Sea Lecture Series: Channel Islands National Park Headquarters, Ventura
- October 14 Santa Barbara Harbor & Seafood Festival, 10 am-5 pm

NOVEMBER - DECEMBER

The winter months are excellent for **tidepooling** because afternoon low tides expose marine algae and invertebrates. Also look for:

Jellies of all kinds

Gray Whales (*Eschrichtius robustus*)



Gray Whales
(*Eschrichtius robustus*)

- November 2 Channel Islands Naturalist Corps, Orientation Meeting, 6:30 pm, Channel Islands National Park Headquarters, Ventura. Shauna.Bingham@noaa.gov
- November 7 Channel Islands Naturalist Corps Orientation Meeting, 6:30 pm
Chase Palm Park Building, Santa Barbara. Shauna.Bingham@noaa.gov
- November 10-12 American Cetacean Society 10th International Conference, "Whales Without Borders," Ventura. Shauna.Bingham@noaa.gov

JANUARY - FEBRUARY

Excellent tidepooling continues. Also look for:

California Brown Pelicans (*Pelecanus occidentalis californicus*)
nesting at Anacapa and Santa Barbara islands

Gray Whales (*Eschrichtius robustus*)

Northern Elephant Seals (*Mirounga angustirostris*) on
San Miguel Island

Pacific Harbor Seals (*Phoca vitulina*) on San Miguel Island



Northern Elephant Seals
(*Mirounga angustirostris*)

- Jan 9-Feb 3 Channel Islands Naturalist Corps Volunteer Training Classes
Shauna.Bingham@noaa.gov
- February 10-12 Ventura County Maritime Museum Anniversary, Channel Islands Harbor,
Fisherman's Wharf

SANCTUARY STAFF

Santa Barbara Harbor Office

- Christopher Mobley – *Sanctuary Superintendent*
- Todd Jacobs – *Deputy Superintendent*
- Amy Cale – *Web Developer*
- Laura Francis – *Education Coordinator*
- Sean Hastings – *Resource Protection Coordinator*
- LT Julie V. Helmers – *Executive Officer*
- Rochelle King – *Administration Specialist*
- Charles Lara – *Deckhand*
- Dani Lipski – *Research Assistant*
- Sarah MacWilliams – *Management Plan Specialist*
- Michael Murray – *Advisory Council and Management Plan Coordinator*
- Luman Moody – *Vessel Captain*
- LTJG Kate Peet – *Operations Officer*
- Robert Schwemmer – *Regional Maritime Heritage Coordinator*
- Natalie Senyk – *Scientific Advisor*
- Terrence Shinn – *Vessel Captain*
- Ben Waltenberger – *Physical Scientist*
- Rebecca Young – *Inventory/Database Coordinator*

Ventura County Field Office

- Shauna Bingham – *Volunteer Program and Outreach Coordinator*
- Julie Bursek – *Education Coordinator*
- Clare Fritzsche – *CINC Volunteer Program & Administrative Assistant*
- Lorri Herr – *Program Support Specialist*
- Rocio Lozano de Knowlton – *MERITO Community Liaison*
- Tina Reed – *Education and Outreach Administrator*

SANCTUARY INTERNS

- Allison Chan – *Resource Protection Intern*
- Daryl Austin – *Education Intern*

HOLLINGS SCHOLARS

- Anja Pfingston
- Desaree Williams
- Anna Cajiga

NATIONAL MARINE SANCTUARY PROGRAM WEST COAST REGION STAFF

- William Douros – *Acting Regional Superintendent*
- Matt Brookhart – *Policy Coordinator*
- Nicole Capps – *Management Support Specialist*
- Dave Lott – *Operations Coordinator*

NATIONAL MARINE SANCTUARY PROGRAM STAFF

- Columbine Culberg – *Ocean Etiquette Program, Manager/Liaison to Aquarium of the Pacific*
- Claire Johnson – *West Coast Education Liaison*
- Sarah Marquis – *West Coast Media Coordinator*

CHANNEL ISLANDS MARINE SANCTUARY FOUNDATION

- Donna Schroeder – *Acting Executive Director*



U.S. Department of Commerce
National Oceanic and
Atmospheric Administration
Channel Islands National Marine Sanctuary
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Santa Barbara, CA 93109

ADDRESS CORRECTION REQUESTED



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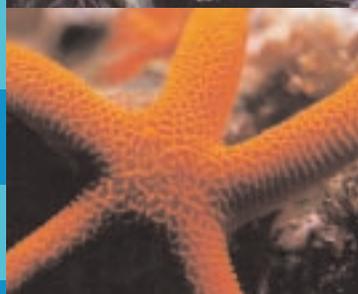
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CALIFORNIA AND THE WORLD OCEAN '06

Implementing the Vision for Ocean and Coastal Protection



**September 17-20, 2006
Hyatt Regency • Long Beach, California**

The 2006 California and the World Ocean Conference will emphasize the need to move from **planning** for future actions, to **taking action** to protect our ocean and coast. This international conference is an opportunity for members of academia, government and non-government organizations, industry, and the public to engage in dialogue on best strategies.

The U.S. Commission on Ocean Policy and the Pew Oceans Commission have documented that our nation's oceans and coastlines are in trouble. They have developed hundreds of recommendations for improvement. In response, Governor Arnold Schwarzenegger released one of the most forward-looking state ocean action plans in the nation, *Protecting Our Ocean: California's Action Strategy*. Across the nation, new state ocean strategies and management councils are being formed. Representatives from all 50 states as well as several foreign countries are expected to attend the conference.

The conference will feature plenary sessions, panels, and paper presentations. The West Coast sanctuaries will present a session on management plans. Poster sessions, workshops, exhibits, field trips, and social gatherings will help foster a fruitful exchange of information and ideas. Organizers include the California Resources Agency, the California Environmental Protection Agency, and the California Coastal Conservancy Association. For more information and registration, visit <http://resources.ca.gov/ocean/cwo06>, email cwo2006@completeconference.com, or call (916) 922-7032.